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MINUTES OF THE 45TH ACNW MEETING  
July 29-30, 1992

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Issued: September 16, 1992

MINUTES OF THE 45TH MEETING OF THE  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
JULY 29-30, 1992  
BETHESDA, MARYLAND

The 45th meeting of the Advisory Committee on Nuclear Waste was held Wednesday and Thursday, July 29-30, 1992, in room P-110, 7920 Norfolk Avenue, Bethesda, Maryland. The purpose of this meeting was to discuss and take appropriate actions on the items listed in the attached agenda.

A transcript of selected portions of the meeting was kept and is available in the NRC Public Document Room at the Gelman Building, 2120 L Street, N.W., Washington, D. C. [Copies of the transcript taken at this meeting may be purchased from Ann Riley & Associates, Ltd., 1612 K Street, N.W., Washington, D. C. 20006.]

Dr. Dade W. Moeller, Committee Chairman, convened the open portion of the meeting at 1:30 p.m. and briefly reviewed the schedule for the meeting. He stated that the meeting was being conducted in conformance with the Federal Advisory Committee Act. He stated that the Committee had received neither written comments nor requests from members of the public for time to make oral statements. However, he invited members of the public, who were present and had something to contribute, to let the ACNW staff know so that time could be allocated for them to make oral statements.

Dr. Moeller noted that a closed session was held earlier with representatives of the U.K. Radioactive Waste Management Advisory Committee to discuss items of mutual interest. [The supplemental minutes of the closed session are not releasable to the public per Exemption (4) of the Freedom of Information Act and 10 CFR 2.790(d)(2).]

ACNW members, Drs. William J. Hinze, Paul W. Pomeroy, and Martin J. Steindler, were present. [For a list of attendees, see Appendix III.]

I. CHAIRMAN'S REPORT (Open)

[Note: Mr. Richard K. Major was the Designated Federal Official for this part of the meeting.]

Dr. Moeller identified a number of items that he believed to be of interest to the Committee, including:

- Ms. Lynn Deering has joined the staff to provide additional technical and administrative support to the members. Ms. Deering is a geologist.

- Dr. Martin Steindler has been awarded the Distinguished Achievement Award from the University of Chicago in recognition of his many years of effort and leadership.

II. STAFF TECHNICAL POSITION ON GEOLOGIC REPOSITORY OPERATIONS  
AREA UNDERGROUND FACILITY DESIGN - THERMAL LOADS (Open)

[Mr. Giorgio N. Gnugnoli was the Designated Federal Official for this part of the meeting.]

INTRODUCTION

Mr. Ronald Ballard, Chief of the Geology and Engineering Branch, Division of High Level Waste Management (HLWM), NMSS, introduced Dr. Mysore Nataraja, Section Chief of the Engineering Section, HLWM, as the lead presenter. Dr. Simon Hsiung, Center for Nuclear Waste Regulatory Analyses (CNWRA), and Dr. Terry Brandshaug, Itasca Consulting Group, Inc., provided additional technical clarification. Mr. Ballard explained that the staff briefed the ACNW on the draft Staff Technical Position on Underground Facility Design - Thermal Loads (STP) in April 1991. At that time the Committee provided verbal comments, endorsed issuing the document for public comment, and requested review of the revised final STP.

NRC STAFF PRESENTATION

Dr. Nataraja indicated that, following the public comment period, NRC held a technical exchange meeting on March 17, 1992, with the DOE and the State of Nevada to discuss their comments and NRC's responses. He indicated that both DOE and the State accepted NRC's responses as satisfactory. He acknowledged that while, the earlier draft STP generated some confusion and allowed for misinterpretations, the technical exchange helped to resolve this confusion and comments made by DOE and the State of Nevada improved the focus and clarity of the document.

Dr. Nataraja summarized highlights of the major comments made by DOE and the State of Nevada and the accompanying NRC responses. For context, Dr. Nataraja first explained that the STP was generated as a result of the regulatory requirements in 10 CFR 60.133 that address design criteria for underground facility design, and specifically, 60.133(i) that states that, "the underground facility shall be designed so that the performance objectives will be met taking into account the predicted thermal and thermomechanical response of the host rock, surrounding strata, and groundwater system." The NRC staff interprets this section to require an understanding of

the thermal, mechanical, hydrological, and chemical (T-M-H-C) coupled processes to the extent that they have an impact on repository performance.

Highlights of Dr. Nataraja's presentation include:

- The NRC staff modified the STP to include an overall, governing principle that for DOE to demonstrate compliance with 60.133(i), it must consider thermal coupling of processes in a manner that is not likely to underestimate the unfavorable aspects of repository performance or overestimate the favorable aspects in the context of underground facility design and analyses. Dr. Nataraja indicated that this principle adds clarity and provides an overall approach, as opposed to prescribing specific models that must be developed.

Dr. Pomeroy asked whether the NRC staff expected that DOE would have done this type of analyses without adding this principle to the STP. Dr. Nataraja responded that it would be unlikely in that DOE made a statement in the comment resolution package that it did not have a plan to study coupling processes in the kind of detail that NRC is expecting.

- The DOE staff questioned the need for fully coupled models, and commented that simple models can work equally as well as fully coupled models. The NRC staff responded that DOE did not have a basis for this statement or assumption.

Dr. Steindler suggested that, given the time and level of complexity required to develop a fully coupled model, a series of simplified models would do a better job than a poorly conceived coupled model. In addition, the STP does not appear to allow DOE the flexibility to use alternative, non-mechanistic approaches early in the process. Dr. Nataraja indicated that the technical position provides the flexibility for DOE to use simplified models if DOE can substantiate their use. Dr. Steindler reiterated that this flexibility was not apparent from his reading of the STP.

- The DOE staff commented that the definition of fully coupled models was ambiguous. The NRC staff agreed and replaced the term, "fully coupled" with "coupled" model and defined coupled behavior in the context of thermal load considerations to mean that each of the T-M-H-C processes affects the initiation and propagation of any of the other processes, and vice versa.

Dr. Hinze asked whether changing the term "fully coupled" to "coupled" actually changed the original meaning. Dr. Nataraja replied that it did. Dr. Pomeroy asked for clarification on the difference between the two concepts. Dr. Nataraja responded that he really did not know what fully coupled was, but coupled means that one process has an impact on initiating the other three processes. In the draft STP, the term "fully coupled" implied that all four processes have an impact on the others. Dr. Terry Brandshaug showed several figures to clarify the point that a coupled model could involve only two processes. In response to a question from Dr. Pomeroy on what is meant by the term, "simplified model", Dr. Brandshaug stated that this term had been removed from the document, except where it refers to codes.

- The DOE staff commented that the STP voids the need for NRC to require a disturbed zone. The NRC staff disagreed with DOE, responding that the disturbed zone applies only to the performance objective dealing with groundwater travel time. Section 60.133(i) addresses all six performance objectives, thus the STP does not relieve DOE from the need to consider coupled processes or a disturbed zone.
- The DOE staff had commented that the STP was too generic. Dr. Nataraja discussed the difficulty of maintaining a balance between overly prescriptive and unduly generic while still providing useful guidance; however, he believed that the guidance provided a generic methodology that was applicable to any site or any design.

Dr. Steindler again raised the concern that the guidance does not appear to give DOE the opportunity to use non-mechanistic models unless they first show that mechanistic models are not feasible, and asked whether this was the NRC's intent. Dr. Nataraja replied that the guidance allows DOE the flexibility to use empirical or simplistic approaches if they can demonstrate that coupling is not needed. However, if DOE does not use mechanistic models, they would have to have a confirmatory program to demonstrate that their simplifying assumptions are conservative. He acknowledged that while it may not be possible to have a mechanistic approach to everything on every scale, if DOE pays attention to this early on they should be able to develop mechanistic approaches. Dr. Steindler reiterated his concerns that the guidance appears to require DOE to develop mechanistic approaches first, before considering other approaches. This could allow DOE to discover too late in the process that

mechanistic approaches may not be feasible, with little time to develop other approaches. He requested that the guidance explicitly acknowledge that if mechanistic approaches are too complex, or appear to be too complex, DOE can use of other approaches. Mr. Ballard agreed to address this concern in the STP.

Dr. Hinze asked Dr. Nataraja whether NRC staff had reviewed for adequacy the DOE study plan on data collection to support development of coupled models. Dr. Nataraja indicated that to the best of his knowledge there was no study plan on this topic. He referred to an older STP that addressed in-situ testing methods, that, in part, addressed testing and data collection. Later in the presentation Dr. Hinze raised this issue again and asked whether there is a need for the NRC staff to request DOE to initiate a study plan to address acquisition of data and testing to support model predictions and to address thermal temperatures on zeolites. He stressed the need for the NRC staff to ensure somehow that testing and data acquisition were being covered.

Finally, Dr. Pomeroy asked whether DOE's system's performance assessment includes thermomechanical interaction, and whether the NRC staff was considering this in their Iterative Performance Assessment. Dr. Nataraja replied that he did not know whether DOE was doing this, and that because of staff shortages, the NRC had not been able to do this yet, but hopes to do so after Phase II of the IPA.

#### ADDITIONAL KEY ISSUES RAISED DURING THE MEETING

- Dr. Pomeroy asked at the beginning of the presentation what need the STP addressed in view of the new revisions. Dr. Nataraja responded that the STP will be used by the NRC staff as a basis to review a thermal load design submitted by DOE, and as a compliance demonstration method for licensing review. In addition, the STP addresses a unique and complex issue where there are no previous examples or precedence established.
- Dr. Pomeroy asked whether the NRC staff expects that DOE will consider other thermal load designs. Dr. Nataraja responded that he did not know, but he would expect that DOE would do so in response to requirement 10 CFR 60.21(c)(ii)(d), which calls for a comparative evaluation of alternatives to major design features that are important to waste isolation. Furthermore, DOE needs to respond to the concerns raised by the Nuclear Waste

Technical Review Board (NWTRB) in its report to Congress on the need to consider other designs.

- Dr. Pomeroy asked for clarification of the phrase, "to the extent practicable," DOE should develop models to predict the thermal and themomechanical response of the host rock, surrounding strata, and groundwater system based on a mechanistic understanding of coupled T-M-H-C behavior. Dr. Pomeroy questioned whether this phrase is an escape clause that lets DOE off the hook to consider coupled processes. Mr. Jim Wolf, Office of the General Counsel, responded that this phrase is meant to allow for flexibility to account for unique circumstances and for use of judgment on both the part of NRC and DOE.
- Dr. Moeller asked whether the CNWRA had an active research program on thermal hydrology. Dr. Nataraja indicated that the CNWRA would be submitting a literature review report on T-M-H-C and Dr. Simon Hsiung indicated that the CNWRA has a thermal hydrology research program.
- Dr. Hinze asked whether the STP had been reviewed by geologists and hydrologists as a follow-up question to his same concern on the draft STP. Dr. Nataraja indicated that his staff has been involved in reviewing the STP since its inception.
- Dr. Pomeroy asked the time frame for issuing the final document. Dr. Nataraja indicated that the document would be sent for publication within a week and should be available by the end of August.

#### CONCLUSION

Dr. Moeller asked the members if they had any unresolved items or questions, other than Dr. Steindler's concern that the STP does not allow for an alternative to use non-mechanistic approaches. Dr. Hinze suggested that, apart from the STP, the NRC staff should see if it would be worthwhile to revisit their comments in the Site Characterization Analysis regarding the thermal loading issue and to determine if a DOE study plan is needed to ensure the timely collection of data needed to support the thermal load analyses. The Committee prepared a memorandum summarizing its comments. The memorandum was sent to Mr. James M. Taylor, Executive Director for Operations.

III. DISCUSSION WITH REPRESENTATIVE OF THE INSTITUTE OF SCRAP RECYCLING INDUSTRIES (Open)

[Note: Mr. Howard J. Larson was the Designated Federal Official for this portion of the meeting.]

Mr. Michael Mattia, Director of Risk Management, Institute of Scrap Recycling Industries, Inc., was the principal presenter. He was assisted by Mr. Joel Lubenau, Office of the Commission (Commissioner de Planque's staff). The Institute of Scrap Recycling Industries represents approximately 500 major groups involved in the recycling of material. Mr. Mattia noted that in 1990, approximately 95 million tons of material were recycled in the United States, of which 58 million tons were scrap iron and steel, three million tons were aluminum and one million tons were stainless steel. By the year 2000, EPA predicts the volume of recycled scrap to double to 190 million tons.

The recycling process has been underway for many years and continues to thrive because of dwindling raw material supplies. Also, the use of scrap in the electric arc furnace permits the steel making process to be more efficient.

He described various incidents over the past decade, noting that some of the more costly resulted in expenditures up to \$4 million each to correct. In all, there have been some 600 reportable incidents. For that reason, radiation detectors have been installed at all of the major recycling centers and should be installed at most all steel mills and scrap reproducers during the next 18 months. He noted that the problem of radioactive contamination is not new, but due to the increase in monitoring and detection capability, it has become a more recognized concern. There are two basic types of contamination: man-made and natural (equipment and materials e.g., aged oil pipelines in need of replacement) that have accumulated NORM.

On a typical day, Mr. Mattia noted that one to five contaminated scrap loads are detected and rejected. He suggested that unless meaningful acceptable contamination levels are promulgated, unscrupulous operators will either leave contaminated materials by the side of the road, dispose of them in abandoned facilities, or export them to other countries. His industry suggests that inherently radioactive materials (such as sealed sources) should not be recycled but items lightly contaminated should be capable of recycling by judicial dilution. The recycling industry is developing recommended practices and procedures and is trying to instruct their members on how best to deal with the problems. A copy of

their draft entitled "Radioactivity in the Scrap Recycling Process-Recommended Practice and Procedure" dated June 25, 1992, was provided to the Members for their perusal.

Dr. Steindler asked what steel mills do with their contaminated ash? Mr. Mattia stated that they dispose of it either as hazardous waste or mixed waste. It was noted that there is no place to process contaminated slag.

Mr. Mattia stated that, since recyclers are not comfortable with materials contaminated with LLW, rather than process or concentrate them, steel mills owners and recyclers return such materials to the generator. Mr. Lubenau noted that the NRC licenses operators to melt cobalt-60 into their refractory bricks (recognizing that some of it will find its way into the steel). Mr. Lubenau also noted that all steel contains some amount of low level radioactive material. ACNW members requested that they be provided with a copy of the NMSS technical report on the establishment of the acceptable value for cobalt-60 in steel.

Mr. Mattia noted in his concluding remarks:

1. The industry can recycle many materials. Once recycled successfully, a market will develop.
2. The industry believes that there is a problem with regard to the recycling of scrap metals that are contaminated with radioactive materials. The industry is willing to work with anyone on a solution. (In this regard, comments on the draft practice and procedure document would be welcomed.)

Dr. Pomeroy observed that a large part of the problem espoused would seem to be part of the larger NARM/NORM concern.

At the conclusion of the presentation and question/answer session, Dr. Moeller thanked Mr. Mattia for his most insightful presentation.

#### IV. NRC FEDERAL LIAISON ACTIVITIES (Open)

[Note: Mr. Howard J. Larson was the Designated federal Official for this part of the meeting.]

Ms. Maria E. Lopez-Otin, Office of State Programs, described how her role as Federal Liaison Manager evolved in response to the need to resolve jurisdictional disputes between NRC and EPA regarding the Clean Air Act. She has worked closely with

staff from the EPA's Administrator's office to bring about the development of a Memorandum of Understanding (MOU) between EPA and NRC, which was signed on March 16, 1992. In 1991 the NRC Federal Liaison program was officially established to develop and maintain communications on policy matters with pertinent Federal Agencies, including EPA, CEQ, DOE, and FEMA. Ms. Lopez-Otin provided a chart showing the interagency committees that NRC participates in.

Ms. Lopez-Otin also mentioned her involvement in the Committee on International Science and Engineering Technology (CISET), the Committee on Earth and Environmental Sciences (CEES), and the parent organization to these committees, the Federal Coordinating Council on Science, Engineering, and Technology (FCCSET). FCCSET was established in 1976 to address science and policy issues affecting multiple Federal agencies. In addition, she described her involvement in a subcommittee of CEES that developed a report entitled, "Federal Groundwater Science and Technology Programs, the Role of Science and Technology in Addressing Four Key National Groundwater Issues." She agreed to provide a copy of the draft report to the Committee. In closing she invited ACNW members to call upon her for additional information on issues regarding other Federal Agencies.

V. NEW YORK STATE'S CHALLENGE TO THE LOW-LEVEL WASTE POLICY AMENDMENTS ACT (Open)

[Mr. Howard J. Larson was the Designated Federal Official for this portion of the meeting.]

Ms. Susan Fonner, Esq., Office of the General Counsel, discussed the recent U. S. Supreme Court decision regarding New York State's challenge to the Low-Level Waste Policy Amendments Act of 1985 (LLRWPAA).

She discussed the relevance of the 10th Amendment to the U. S. Constitution, related excerpts from the LLRWPAA (i.e., milestones, surcharges and penalties) and the current status of the Compacts. Of particular relevance to this decision by the Supreme Court was the "take-title" provisions of the LLRWPAA. There are two such provisions in the Act, although only the second one is generally viewed as such. The first provision (which has an effective date of January 1, 1993) provides for either damages or forfeiture of surcharges, while the second one (with an effective date of January 1, 1996) provides only for damages. The Court held that, while the rest of the Act is severable from the "take-title" provisions, the Federal government cannot mandate a state to take an

action without providing an alternative. Since there was no alternative provided in the second "take-title" provision, it was held to be unconstitutional.

It was pointed out that this decision only applies to states that are not members of a Compact. It does not answer the same question for states that belong to a Compact.

Among the questions directed to Ms. Fonner, Dr. Steindler asked whether the Compact system, as presented in the LLRWPA, would "fall apart" if the states failed to do anything more between now and January 1, 1996. Ms. Fonner replied that it is the opinion of many that, although the "take-title" provision is regarded as a major incentive for action in the Act, the denial of access by the sited states, as well as the potential future costs for disposing of LLW, represent uncertainties that should be adequate to motivate the states to take action.

Dr. Hinze queried whether there was any sentiment currently in Congress to amend the Act. He was told that none has been heard so far. The inclination of Congress, it is believed, is to let things sort themselves out during this election year. Inevitably, there will be a resolution to the overall problem, but that may be a year or two away.

VI. EXECUTIVE SESSION (Open)

[Note: Mr. Richard K. Major was the Designated Federal Official for this part of the meeting.]

A. Memoranda

Staff Technical Position on Geologic Repository Operations Area Underground Facility Design - Thermal Loads (Memorandum to James M. Taylor, Executive Director for Operations, dated August 4, 1992)

Progress in Site Characterization Activities (Memorandum to Robert M. Bernero, Director, Office of Nuclear Material Safety and Safeguards, dated August 4, 1992)

B. Comprehensive Systems Analysis of the High-Level Radioactive Waste Management and Disposal Program

The Committee continued its discussion on the supplemental request from Chairman Selin, made during the Commission meeting on April 24, 1992, for an identification of the elements the

Committee believes should be included in a full systems analysis.

C. ACNW Future Activities

- The Committee discussed a proposed agenda for the 47th ACNW meeting, tentatively scheduled to be held on October 21, 1992, in Las Vegas, Nevada.
- The Committee agreed to change the dates for the 48th ACNW meeting from November 19-20, 1992, to November 16-17, 1992. This change will allow several members to attend the Nuclear Waste Technical Review Board meeting in Las Vegas.
- Mr. Raymond Fraley advised the members that the meeting with the Commission has been scheduled to be held during the 49th ACNW meeting, December 17-18, 1992.

D. Future Meeting Agenda

Appendix III summarizes the proposed items endorsed by the Committee for the 46th ACNW Meeting, September 23-25, 1992, and future Working Group meetings. This list includes items proposed by the Commissioners and NRC staff as well as ACNW members.

The meeting was adjourned at 4:25 p.m., Thursday, July 30, 1992.